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Group Art Unit: 2813

REMARKS

Amendment

The Specification page 7, lines 3-26 and lines 31-32, have been amended to more clearly describe the base of the torch bump and the torch bump, which appear in Specification FIGs. 5 - 9. The torch bump 36 is described as having a flat bottom area by which it is bonded to the larger flat top area of the layer 32. No new matter has been introduced by the amendment based on *In re Wofensperger*, 302 F.2d 950, 133 USPQ 537 (CCPA 1962), which held that drawings alone may provide the basis for subsequent amendments to the specification without producing prohibitory new matter.

Claim Rejections - 35 USC §102

Claims 30-31, 36, and 41-42 are rejected under 35 U.S.C. 102(e) as being anticipated by Chiu et al. (U.S. Patent No. 6,586,322, hereinafter "Chiu").

Chiu discloses a bump on a substrate such as a semiconductor wafer or flip chip. A semiconductor device is provided having a contact pad and an upper passivation layer with an opening formed in the upper passivation layer, exposing a portion of the contact pad. An under bump metallurgy covers the upper passivation layer and the contact pad. The bump is formed by depositing a first photoresist in a liquid state over the under bump metallurgy. A second photoresist, a dry film photoresist, is deposited on the first photoresist, forming a mask. After exposure and removal of the second photoresist, the unexposed portions of the first photoresist are removed, leaving an empty column aligned above the contact pad. Seed layers and electrically conductive material are deposited in the column and the exposed portions of the first photoresist are removed to form the bump.

With regard to claim 30, this independent claim has been clarified to amend the previously claimed combination to now include the limitation not disclosed in Chiu of:

"a base of said torch bump overlying said contact pad and having a flat top area, said base having said torch bump bonded to the flat top area at a flat bottom area of said torch bump, said flat top area larger than the flat bottom area." [underlining for clarity]

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The support for the above amendment is in FIGs. 5-9 and Specification page 7, lines 31-32.

Chiu discloses a base having a top area with raised edges and a bump with a bottom that has raised edges in Chiu, FIG. 3K. The Chiu base and bump are not flat, and the bottom area of the bump covers the entire area of the base.

In the present invention, the claimed structure provides the bump on base, which is in the configuration of a torch, for a high-density, high performance flip chip package.

Based on the above, it is respectfully submitted that claim 30 is allowable under 35 USC §102(e) as not being anticipated by Chiu because:

“Anticipation requires the presence in a single prior art reference disclosure of each and every element of the claimed invention, *arranged as in the claim.*” [*emphasis added*] Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co. (730 F.2d 1452, 221 USPQ 481, 485 (Fed. Cir. 1984)(citing Connell v. Sears, Roebuck & Co., 722 F.2d 1542, 220 USPQ 193 (Fed. Dir. 1983))).

Withdrawal of the rejection is respectfully requested.

With regard to claims 31, 36, and 41-42, these dependent claims respectively depend from independent claim 30 and are believed to be allowable since they contain all the limitations set forth in the independent claim from which they depend and claim additional unobvious combinations thereof.

Claim 31 was also amended to more accurately describe the invention. The support for the amendment to claim 31 can be found in the specification page 7, lines 3-8. No new matter has been added.

Claim 36 was also amended to more accurately describe the invention. The support for the amendment to claim 36 can be found in the amended specification page 7, lines 3-6. No new matter has been added.

Claim 41 was also amended to correct a typographical error. No new matter has been added.

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Claim 42 was also amended to more accurately describe the invention. The support for the amendment to claim 42 can be found in the amended specification page 7, lines 3-6. No new matter has been added.

It is respectfully submitted that the now amended independent claim 30, and the respective claims 31, 36, 41, and 42 depending therefrom, are neither anticipated by Chiu taken singularly under 35 USC §102 nor obvious in combination under 35 USC §103 with the other cited references.

Claim Rejections - 35 USC §103

Claims 1-2, 4-29, and 46-52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chiu et al. (U.S. Patent No. 6,586,322, hereinafter "Chiu") as applied to claims 30-31, 36, and 41-42 above in view of the Admitted Prior Art of the Present Invention (pages 15-16) and Rinne (U.S. Patent No. 6,492,197, hereinafter "Rinne").

Chiu has been summarized above.

Rinne discloses fabricating solder bumps by plating a first solder layer on an under bump metallurgy, plating a second solder layer having higher melting point than the first solder layer on the first solder layer, and plating a third solder layer having lower melting point than the second solder layer on the second solder layer. The structure then is heated to below the melting point of the second solder layer but above the melting point of the first solder layer and the third solder layer, to alloy at least some of the first solder layer with at least some of the under bump metallurgy and to round the third solder layer.

With regard to claims 1-2 and 4-29, these claims are not pending in the current application. Claims 1-2 and 4-29, which were allowed in the parent application, were canceled in a preliminary amendment filed with this application on March 1, 2004.

With regard to claims 46-52, these claims do not exist in the current application. The application only contained claims 1-45.

Withdrawal of the rejection is respectfully requested.

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The other references cited by the Examiner showing the prior art have been considered and are not believed to disclose, teach, or suggest, either singularly or in combination, Applicants' invention as claimed.

Other

With regard to claim 32, this claim was amended to more accurately describe the invention. The support for the amendment to claim 32 can be found in the specification page 7, lines 3-8. No new matter has been added.

With regard to claim 37, this claim was amended to more accurately describe the invention. The support for the amendment to claim 37 can be found in the specification page 7, lines 9-18. No new matter has been added.

With regard to claim 43, this claim was amended to more accurately describe the invention. The support for the amendment to claim 43 can be found in the amended specification page 7, lines 3-6, and page 9, lines 20-23. No new matter has been added.

With regard to claim 44, this claim was amended to more accurately describe the invention. The support for the amendment to claim 44 can be found in the amended specification page 7, lines 3-6. No new matter has been added.

With regard to claim 45, this claim was amended to more accurately describe the invention. The support for the amendment to claim 45 can be found in the specification page 7, line 8. No new matter has been added.

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Conclusion

In view of the above, it is submitted that the claims are in condition for allowance and reconsideration of the rejections is respectfully requested. Allowance of claims 30-45 at an early date is solicited.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including any extension of time fees, to Deposit Account No. 50-0374 and please credit any excess fees to such deposit account.

Respectfully submitted,



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